Claims:

1. An electrochemical plating cell, comprising:

a fluid basin configured to contain a plating solution;

an anode fluid volume positioned in a lower portion of the fluid basin;

a cathode fluid volume positioned in an upper portion of the fluid basin;

an ionic membrane positioned to separate the anode fluid volume from the cathode fluid volume;

a plating electrode centrally positioned in the anode fluid volume; and

a deplating electrode positioned radially outward from the plating electrode in the anode fluid volume.

2. The plating cell of claim 1, wherein the plating electrode comprises an insoluble anode.

3. The plating cell of claim 2, wherein the insoluble anode comprises a platinum electrode surface.

4. The plating cell of claim 2, wherein the deplating electrode comprises an annular platinum coated electrode positioned to circumscribe the inert anode and in substantially the same plane as the inert anode.

5. The plating cell of claim 1, further comprising an insulative spacer positioned between the plating electrode and the deplating electrode.

6. The plating cell of claim 1, further comprising a power supply in electrical communication with the deplating electrode and the plating electrode, the power supply being configured to cathodically bias the deplating electrode in a deplating configuration and anodically bias the plating electrode in a plating configuration.

7. The plating cell of claim 1, further comprising a power supply in electrical communication with the deplating electrode and the plating electrode, the power supply being configured to anodically bias the plating electrode in a plating configuration and selectively bias the deplating electrode anodically in the plating configuration and cathodically in a deplating configuration.

8. The plating cell of claim 1, wherein the plating electrode is copper and the deplating electrode is a platinum coated electrode.

9. An electrochemical plating cell, comprising:

an anolyte compartment;

a catholyte compartment positioned in ionic communication with the anolyte compartment via a cationic membrane;

an anode positioned in the anolyte compartment; and

a deplating electrode positioned in the anolyte compartment.

10. The plating cell of claim 9, wherein the anode and the deplating electrode comprise a platinum outer surface.

11. The plating cell of claim 10, wherein the anode is a disk shaped member having a substantially planar upper surface and wherein the deplating electrode is an annular member having a substantially planar upper surface.

12. The plating cell of claim 11, wherein the annular member is positioned to circumscribe the disk shaped member.

13. The plating cell of claim 12, wherein an inner diameter of the annular member is greater than an outer diameter of a substrate plated in the plating cell.

14. The plating cell of claim 13, wherein an outer diameter of the disk shaped member is sized to be between about 2 mm and about 10 mm larger than the outer diameter of the substrate.

15. The plating cell of claim 11, comprising an electrically insulative spacer positioned between the disk shaped member and the annular member.

16. The plating cell of claim 9, wherein the anode is in communication with an anodic terminal of a power supply and wherein the deplating electrode is in communication with a cathodic terminal of the power supply.

17. The plating cell of claim 9, wherein the anode is in communication with an anodic terminal of a power supply and wherein the deplating electrode is selectively in communication with a cathodic terminal of the power supply and the anodic terminal of the power supply.

18. A method for plating a metal onto a substrate, comprising:

positioning a substrate in a plating cell having an anolyte compartment, a catholyte compartment, and an ionic membrane fluidly separating the anolyte compartment from the catholyte compartment;

supplying a first plating bias to an anode positioned in the anolyte compartment to plate the metal onto the substrate; and

supplying a deplating bias to a deplating electrode positioned in the anolyte compartment.

19. The method of claim 18, wherein the plating bias is supplied to an anode having a platinum outer surface and wherein the deplating bias is supplied to a deplating electrode having a platinum outer surface.

20. The method of claim 18, comprising applying a second plating bias to the deplating electrode during at least a portion of a duration of the first plating bias.

21. The method of claim 20, wherein a duration of the second plating bias corresponds to a duration of the deplating bias.